



# AGRICULTURAL ALTERNATIVES

## Bison Production

Bison, commonly referred to as the American Plains Buffalo, are not only native to the Great Plains and the Midwest but also once roamed the mountain slopes and valleys of Pennsylvania. The state's last native bison was shot in 1801. Commercial breeders and bison enthusiasts have since reintroduced bison to Pennsylvania. The northeastern United States has nearly 175 domestic herds with a total of over 3,800 bison. According to the USDA 2012 *Census of Agriculture*, nearly 60,000 bison are sold annually in the United States, and the USDA *Meat, Poultry, and Egg Product Inspection Directory* lists about 90 bison-processing facilities nationwide.

Although bison still have many of their wild tendencies and are only semi-domesticated, they are an agricultural alternative that may be appropriate for some small-scale and part-time farms. Bison adapt to a wide range of environments, feed sources, and management systems. A herd should consist of at least one bull and 10 to 15 cows. In Pennsylvania, herd sizes range from small operations with fewer than 25 bison to large operations with more than 200 bison. However, most Pennsylvania herds average only 16 animals. Only a few U.S. herds have more than 1,000 animals.

## Marketing

Bison breeders must work hard to develop their own markets, but several marketing tools are available. State and national bison associations often have booths and provide marketing information at agricultural events. Pamphlets printed by the associations or individual breeders also provide examples of how to market bison products. Breeders can advertise in association magazines, local newspapers, and agricultural publications. In addition, the novelty of bison herds usually attracts attention in the local community through newspaper and television coverage.



Bison are raised commercially for various markets:

- Meat, heads, bones, and hides are sold to restaurants, novelty shops, and individual buyers. A growing number of supermarkets are also selling bison meat.
- Both bulls and heifers are sold to other producers for breeding stock.
- Animals are sold for organized bison hunts.
- Bison are sold to public game reserves and zoos.

In Pennsylvania, bison are sold mainly for meat, byproducts, and breeding stock. Most of the meat sold comes from bison bulls slaughtered between 18 and 36 months of age at a weight of 1,100 to 1,200 pounds. Many producers use direct-marketing methods to sell bison meat. Major markets include wholesalers, restaurants, custom meat stores, and the general public through mail-order or on-farm sales. The meat usually is custom cut, vacuum packed, frozen, and shipped according to the buyer's specifications.

Because bison meat has a low fat content (less than 3 percent) and a cholesterol content that is lower than that of beef, organizations such as the American Heart Association and Weight Watchers recommend bison meat as a healthy alternative (Table 1).

Many consumers prefer bison meat because it is produced without the use of hormones or antibiotics. As a result of society’s increased nutritional awareness, the demand for bison meat has grown faster than the supply. Bison meat sells at a considerable price premium to beef.

Other by-products of meat production include bison heads and hides. Heads are sold as mounted trophies or as cleaned or uncleaned skulls. Manufacturers of leather goods purchase the untanned hides. The heads and hides must be taken to a tannery within hours of removal for the highest quality. Some producers even find a market for the hooves, bones, and hair.

Breeding stock is sold at consignment sales and auctions or through personal contacts. It is important to build contacts with other bison producers for the sale of breeding stock. Small herds, in particular, need make sure that they maintain genetic diversity in their herds.

## Beginning Production

If possible, before purchasing any bison, observe several herds and visit farm sales and auctions. The best strategy is usually to start small and grow. Raising bison is similar, but not identical, to raising beef cattle. Bison are larger, stronger, and more excitable than cattle and thus require special fencing and handling facilities. Because bison are still considered a wild animal, you should plan a strong corral-chute system appropriate for your location and expected herd size. Allow for the same amount of pasture per bison as is required for cattle in your area, usually 2 to 3 acres per cow and calf in the eastern United States. In addition, know the state laws concerning liability and trespassing because your herd is likely to draw the attention of the public. You should check with your insurance provider before purchasing your first animal as bison are considered an attractive nuisance and require a specialty insurance product. This type of insurance policy may be more expensive than a traditional farm owner’s policy. More information on farm liability

risk and agricultural business insurance and be found in “Agricultural Alternatives: Understanding Agricultural Liability” and “Agricultural Alternatives: Agricultural Business Insurance.”

Bison raised for agricultural purposes are currently in the same category as cattle under state and federal law, but they are slaughtered under the regulations for exotic animals. Before purchasing your bison, you must understand these distinctions. Contact a lawyer for clarification of local ordinances and regulations. Bison are not domesticated animals and must be handled with caution if they get loose.

## Fencing and Housing

Bison require no outside shelter and they will turn to face storms and may appear to become dormant during heavy snow fall. They will lie down during heavy snow and let the snow cover their bodies. Predators are also of little concern as the herd will defend themselves. They will circle the predator and drive it from their domain.

Because bison can jump fences and break through almost any barrier, a strong containment system is essential. Fences around the pasture should consist of eight high-tensile wires, three of which carry a high voltage of electricity, or equivalent fencing. A corral-chute system with no sharp turns or corners and with sides 7 to 8 feet high is recommended. The system should include catwalks, feed bunks, water, lighting, tractor access, plenty of space for each animal, and spring-loaded, locking slam gates. The squeeze chute should have a crash gate and palpation cage. A crowding circle, alleyway(s), and sorting pens are also necessary.

Ideal land for bison would have boulders, rocks, rugged areas, woods, and thickets, but the only requirements are adequate pasture and a water source. Running water is preferable, but a pond will suffice. If you satisfy a bison’s food and water requirements, it will stay within the fenced area. Otherwise, almost no barrier can stop a hungry bison.

**Table 1. Nutritional comparison of bison sirloin, beef sirloin (choice), and chicken breast with skin on.**

*All samples per 100 grams (3.5 ounces) cooked meat. Updated March 2007.*

Species	Fat (g)	Protein (g)	Calories (kcal)	Cholesterol (mg)	Iron (mg)	Vitamin B-12 (mcg)
Bison	2.4	28.4	143	82	3.4	2.9
Beef (choice)	18.5	27.2	283	87	2.7	2.5
Beef (select)	8.1	29.9	201	86	3.0	2.6
Pork	9.7	29.3	212	86	1.1	0.8
Chicken (skinless)	7.4	28.9	190	89	1.2	0.3
Salmon (sockeye)	11.0	27.3	216	87	0.6	5.8

Bison, separable lean only, cooked, roasted. USDA ND6. No. 17157.

Beef, composite of trimmed retail cuts, separable only trimmed to 0” fat, choice, cooked. USDA ND6. No. 13362.

Beef, composite of trimmed retail cuts, separable only trimmed to 0” fat, select cooked. USDA ND6. No. 13366.

Pork, fresh, composite retail cuts (leg, loin, and shoulder), separable lean only, cooked. USDA ND6. No. 10093.

Chicken, broilers or fryers, meat only, roasted. USDA ND6. No. 05013.

Salmon, sockeye, cooked, dry heat. USDA ND6. No. 15086.

## Breeding

Mature cows weigh between 1,000 and 1,500 pounds, reaching peak physical maturity at 8 to 10 years of age. They can live to be 30 years old or more. With good management, cows can reproduce every year and can begin breeding at two years of age. The normal gestation period is 280 to 285 days. The breeding season begins in August and continues into October, while the calving season begins in May and continues into July. Bulls weigh about 2,000 pounds at maturity and can be used for breeding at two years of age. One bull can breed 10 to 15 cows.

Some producers are trying artificial insemination, but natural breeding methods are safer because of the bison's unpredictable temperament and the scarcity of bison semen. To prevent inbreeding and improve the herd, new young bulls should be brought into the herd every two or three years. Do not keep any one bull in the same herd for longer than three years. However, if you have a superior bull (a high-producing, dominant bull), it may be difficult to rotate new bulls into the herd. You can separate the calves after weaning and sell the calves at slaughter weight. This will allow you to keep a superior bull longer than two to three years. The goal of the producer should be to improve the performance of the herd by breeding and selecting bigger animals that gain weight faster. The following practices are recommended for a herd breeding program:

- Keep accurate health and reproduction records.
- Cull cows that are difficult to breed and animals that are slow to recover from sickness or injury or that gain weight slowly.
- Cull all but the best bulls, and bring new young bulls into the herd for breeding on a regular basis.

## Health Program

Bison are closely related to cattle, so they are susceptible to many of the same diseases. However, bison have stronger immune systems. Because they live in the open, they are less likely to infect one another. You should vaccinate your bison herd for common cattle diseases. As a precautionary measure, test and quarantine all new animals for three months before allowing them to enter the herd. Because of the bison's rugged nature and calving ease, a veterinarian's assistance is rarely needed; however, you should locate a veterinarian for vaccinations and emergencies.

Bison should be on a routine deworming program for tapeworms, roundworms, lungworms, flukes, and other parasitic worms. The deworming program should be developed with a veterinarian, and should take into account climate, regional and farm parasite problems, and grazing intensity. External parasites, including flies, louses, mites, and ticks, can be controlled with strips, baits, sprays, foggers, dust bags, and liquid products.

Any bison transported across state lines must have all their health records, including negative bovine tuberculosis and bovine brucellosis tests, prior to shipment. Bison born on your farm and transported from your farm directly to an in-state slaughter facility do not need testing or health records.

## Nutrition

In the wild, bison eat twigs, leaves, and grasses. An intensive grazing program will help you make the most use of your pasture. Bison continue to graze through the winter by rooting under the snow. Grasses that stand up through the snow and retain a high protein percentage in the stems are best for winter pasture. Hay should be available when the snow is coated with ice. Grain rations should be included in the winter or when pasture conditions are poor.

Salt, vitamins, and minerals should be added to the diet as needed. The extra nutrition gained from supplements increases reproductive efficiency and weight gain. Selenium is especially important for reproduction because a deficiency of this mineral causes an increased number of aborted calves. The soils in the eastern United States have very little selenium, and since bison get most of their nutrition from forage, it is important to supplement selenium.

Bison require 1 pound of roughage per 100 pounds of body weight for digestion and 2 pounds of dry matter per 100 pounds of live weight for energy. Clean, fresh water should be available at all times. A herd of 32 animals may require up to 500 gallons of water per day during the summer months. For added weight gain and to improve meat texture and flavor, you should begin feeding grain 90 to 120 days prior to slaughtering. The meat of bison finished on corn has a taste similar to beef, which many consumers prefer.

## Slaughter

Bison are considered an exotic or "non-amenable" species and are under voluntary inspection. This means that unless you will transport the meat across state lines, inspection is not necessary. Although Pennsylvania does not require meat inspection of slaughtered bison, many restaurants and retailers prefer USDA- or state-inspected meat. Voluntary inspection is handled under the Agriculture Marketing Act. USDA inspection is required if meat is to be sold across state lines. Five USDA-inspected slaughter plants licensed for bison operate in Pennsylvania, but any meat-processing plant licensed for exotics can slaughter bison. However, the plant must be willing to thoroughly clean the plant before and after the slaughter and must have equipment to adequately handle the larger animals.

In addition to slaughtering costs, the rates charged by individual plants and USDA inspectors is \$60 per hour for the inspection with a three-hour minimum per animal for a cost

### Initial Resource Requirements

- Land: 25–40 acres
- Labor: 400–500 hours
- Capital
  - Livestock:* \$20,000–35,000
  - Buildings, equipment, and fencing:* \$35,000–40,000
  - Total capital invested:* \$55,000–75,000**

**Figure 1.** USDA symbol for non-amendable species.



of at least \$180. The symbol used for non-amenable species is triangular in shape, which easily distinguishes it the traditional circular USDA symbols used for meat and poultry slaughter plants (Figure 1).

## Environmental Impacts

In the normal course of operations, farmers handle pesticides and other chemicals, may have manure to collect and spread, and use equipment to prepare fields and harvest crops. Any of these routine on-farm activities can be a potential source of surface water or groundwater pollution. Because of this possibility, you must understand the regulations to follow concerning the proper handling and application of chemicals and the disposal and transport of waste. Depending on the watershed where your farm is located, there may be additional environmental regulations regarding erosion control, pesticide leaching, and nutrient runoff. Contact your soil and water conservation district, extension office, zoning board, state departments of agriculture and environmental protection, and your local governing authorities to determine what regulations may pertain to your operation.

## Risk Management

You should carefully consider how to manage risk on your farm. First, you should insure your facilities and equipment. This may be accomplished by consulting your insurance agent or broker. It is especially important to have adequate levels of

property, vehicle, and liability insurance. You will also need workers' compensation insurance if you have any employees. You may also want to consider your needs for life and health insurance and if you need coverage for business interruption or employee dishonesty. For more on agricultural business insurance, see "Agricultural Alternatives: Agricultural Business Insurance." For more information on farm liability issues, see "Agricultural Alternatives: Understanding Agricultural Liability."

Second, check to see if there are multi-peril crop insurance programs available for your crop or livestock enterprises. There are crop insurance programs designed to help farmers manage both yield risk and revenue shortfalls. However, individual crop insurance coverage is not available for all crops. Whole Farm Revenue Protection (WFRP) provides a risk management safety net for all commodities on your farm under one insurance policy. You can buy WFRP alone or with other buy-up level (additional) federal crop insurance policies. Coverage levels range from 50 to 85 percent of your expected revenue or whole farm historic average revenue (based on your 1040-F information), whichever is lower. For more information concerning crop insurance, contact a crop insurance agent or check the USDA Risk Management Agency Website at <https://www.rma.usda.gov/>.

## Budgeting

Included in this publication is a bison production budget. The budget summarizes the receipts, costs, and net returns of a bison cow-calf operation in which the offspring are sold for slaughter. This sample budget should help ensure that all costs and receipts are included in your calculations. Costs and

### Sample Bison Cow-Calf Budget on Pasture

Animals sold at 30 months of age raised on a hay-pasture program. Based on a herd of 14 cows and 1 bull.

Item	Quantity	Unit	Value	Total	Your Estimate
<b>Receipts (per cow)<sup>1</sup></b>					
2.5 year old bull	0.5	animal	\$3,000.00	\$1,500.00	
2.5 year old heifer	0.5	animal	\$2,600.00	\$1,300.00	
1.5 year old bull	0.5	animal	\$2,600.00	\$1,300.00	
1.5 year old heifer	0.5	animal	\$2,400.00	\$1,200.00	
0.5 year old bull calf	0.5	animal	\$1,400.00	\$700.00	
0.5 year old heifer calf	0.5	animal	\$1,400.00	\$700.00	
<i>Receipts</i>				<i>\$6,700.00</i>	
Less 3% death loss				<i>-\$201.00</i>	
<i>Value of livestock</i>				<i>\$6,499.00</i>	
<b>Variable Costs</b>					
<i>Feed requirements for cow and calf</i>					
Pasture maintenance <sup>2</sup>	2.5	acre <sup>3</sup>	\$250.00	\$625.00	
Hay (mixed grass and legumes)	2.25	ton	\$170.00	\$382.50	

(continued)

Sample Bison Cow-Calf Budget on Pasture (continued)

Item	Quantity	Unit	Value	Total	Your Estimate
Ground corn	1.25	cwt	\$15.00	\$18.75	
Salt and minerals	250	lb	\$0.80	\$200.00	
Feed costs for cow and calf				\$1,226.25	
<i>Feed requirements for yearling and market animals</i>					
Pasture maintenance <sup>2</sup>	2.5	acre <sup>4</sup>	\$200.00	\$500.00	
Hay (mixed grass and legumes)	2.25	ton	\$125.00	\$281.25	
Ground corn	1.5	cwt	\$15.00	\$22.50	
Salt and minerals	275	lb	\$0.80	\$220.00	
Feed costs for market animal				\$1,023.75	
<i>Feed for finishing bull</i>					
Pasture maintenance <sup>2</sup>	0.2	acre <sup>3</sup>	\$250.00	\$50.00	
Hay (mixed grass and legumes)	0.2	ton	\$170.00	\$34.00	
Salt and minerals	18	lb	\$0.80	\$14.40	
Feed costs for bull				\$98.40	
Total feed costs				\$2,348.40	
Health program	1	animal	\$200.00	\$200.00	
Hired labor	15	hours	\$13.00	\$195.00	
Transportation				\$0.00	
Marketing and inspection	1	animal	\$200.00	\$200.00	
Interest on operating capital				\$2,469.06	
<i>Total variable costs</i>				\$5,412.46	
<b>Fixed Costs</b>					
Depreciation on cow <sup>5</sup>	0.2	animals	\$2,500.00	\$500.00	
Depreciation on bull <sup>5</sup>	0.015	animals	\$3,000.00	\$45.00	
Insurance	1	animal	\$11.00	\$11.00	
Repairs and maintenance	1	animal	\$21.75	\$21.75	
Land charge	2.5	acre <sup>3</sup>	\$312.50	\$312.50	
Interest on investment	1	animal	\$65.26	\$65.26	
Total fixed costs				\$955.52	
<b>Total Costs</b>				<b>\$6,367.98</b>	
<b>Return to management over 30-month production cycle</b>				<b>\$332.02</b>	

1. Animals are generally sold at 30 months of age.

2. Pasture maintenance includes seed, fertilizer, lime, and mowing.

3. Cost reflects use for 30 months.

4. Cost reflects use for 24 months.

5. Cows and bulls are kept for 17.5 years.

You should monitor local markets and contact suppliers to determine current values for all items contained in this sample budget.



returns are often difficult to estimate in budget preparation because they are numerous and variable. Therefore, you should think of this budget as an approximation and then make appropriate adjustments in the “Your Estimate” column to reflect your specific production and resource situation. More information on the use of livestock budgets can be found in “Agricultural Alternatives: Budgeting for Agricultural Decision Making.”

## For More Information

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### Publications

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- National Buffalo Association. *Buffalo Producer’s Guide to Management and Marketing*. Westminster, CO: National Buffalo Association, 1990.

### Associations

Eastern Bison Association  
10685 Buffalo Road  
Greenwood, DE 19950  
[www.ebabison.org](http://www.ebabison.org)

Minnesota Buffalo Association  
22627 Buffalo Ridge Road  
Winona, MN 55987  
[mnbison.org](http://mnbison.org)

Missouri Bison Association  
4319 S. National Ave #28 Box 286  
Springfield, MO 65810-2607  
[info@mobisonassoc.org](mailto:info@mobisonassoc.org)

Texas Bison Association  
PO Box 10280  
College Station, TX 77842  
[www.texasbison.org/11357822\\_95014.htm](http://www.texasbison.org/11357822_95014.htm)

Wisconsin Bison Association  
[www.wibison.com/index.iml](http://www.wibison.com/index.iml)

### Websites

ATTRA  
Bison Production  
[attra.ncat.org/attra-pub/summaries/summary.php?pub=252](http://attra.ncat.org/attra-pub/summaries/summary.php?pub=252)

North Dakota State University  
Commercial Bison Production: Economic Analysis and Budget Projections  
[www.ag.ndsu.edu/archive/carringt/bison/econ\\_analysis.htm](http://www.ag.ndsu.edu/archive/carringt/bison/econ_analysis.htm)

United States Department of Agriculture  
Bison from Farm to Table  
[www.fsis.usda.gov/wps/portal/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation/focus-on-bison/ct\\_index](http://www.fsis.usda.gov/wps/portal/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation/focus-on-bison/ct_index)

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